L15: Entry 3 of 9 File: USPT May 20, 2003

US-PAT-NO: 6567745
DOCUMENT-IDENTIFIER: US 6567745 B2

TITLE: System and method for distributed navigation service

DATE-ISSUED: May 20, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Fuchs; Axel | Park Ridge | IL | | |
| Bullock; James Blake | Gilbert | AZ | | |
| Gee; Robert A. | Tempe | AZ | | |
| Gonsalves; Stanislaus | Elgin | IL | | |
| Kohley; Jeffrey | Carol Stream | IL | | |
| McNulty; Mark | Carol Stream | IL | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| Motorola, Inc. | Schaumburg | IL | | | 02 |

APPL-NO: 10/ 184755 [PALM]
DATE FILED: June 28, 2002

PARENT-CASE:
RELATED U.S. APPLICATION DATA Continuation of Ser. No. 09/667,354, Sep. 22, 2000, now issued as U.S. Pat. No. 6,421,607.

INT-CL: [07] G01 C 21/00

US-CL-ISSUED: 701/209; 701/211, 340/988
US-CL-CURRENT: 701/209; 340/988, 701/211

FIELD-OF-SEARCH: 701/25, 701/117, 701/118, 701/119, 701/201, 701/209, 701/211, 340/905, 340/988, 340/990, 340/995

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS



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| ☐ | 5790974 | August 1998 | Tognazzini | |
| ☐ | 6421607 | July 2002 | Gee et al. | 701/209 |

ART-UNIT: 3661

PRIMARY-EXAMINER: Beaulieu; Yonel

ATTY-AGENT-FIRM: Wills; Kevin D.

ABSTRACT:

A distributed navigation system and method for providing driving instructions to a user. The system includes a service center having a navigation server and associated workstations. The service center stores driving instructions in a continuously updated map database. In response to a user request the instructions are transmitted by way of a wireless network to a client device residing in the user vehicle. The instructions are assembled into sequential stepwise driving directions and stored in a storage device in the client device. Commands from the user trigger playback of the driving instructions in a stepwise fashion.

20 Claims, 4 Drawing figures

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L15: Entry 4 of 9 File: USPT Apr 22, 2003

US-PAT-NO: 6553308
DOCUMENT-IDENTIFIER: US 6553308 B1

TITLE: Vehicle-based navigation system with smart map filtering, portable unit home-base registration and multiple navigation system preferential use

DATE-ISSUED: April 22, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Uhlmann; Eugenie V. | Tucson | AZ | | |
| O'Farrell; Desmond J. | Holland | MI | | |
| Schofield; Kenneth | Holland | MI | | |
| Lynam; Niall R. | Holland | MI | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| Donnelly Corporation | Holland | MI | | | 02 |

APPL-NO: 09/ 561023 [PALM]
DATE FILED: April 28, 2000

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATION This application claims priority from provisional patent application Ser. No. 60/131,593 filed on Apr. 29, 1999.

INT-CL: [07] G08 G 1/123, G01 C 21/00, G01 C 15/00

US-CL-ISSUED: 701/208; 701/200, 340/988
US-CL-CURRENT: 701/208; 340/988, 701/200

FIELD-OF-SEARCH: 701/200, 701/207, 701/24, 701/208, 701/213, 701/300, 701/36, 701/209, 701/2, 340/286.01, 340/988, 340/995, 340/990

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

| | PAT-NO | ISSUE-DATE | PATENTEE-NAME | US-CL |
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| ☐ | 5519621 | May 1996 | Wortham | 364/460 |

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| ☐ | 6212470 | April 2001 | Seymour et al. | 701/207 |

ART-UNIT: 3661

PRIMARY-EXAMINER: Nguyen; Tan Q.

ASSISTANT-EXAMINER: Tran; Dalena

ATTY-AGENT-FIRM: Van Dyke, Gardner, Linn & Burkhart, LLP

ABSTRACT:

A vehicle-based navigation system is described including a position locator that establishes the geographic position of the vehicle and a map database located external to and remote from the vehicle. The system determines at least one of a vehicle parameter and a personal parameter, and transfers data from the remote map database to the vehicle and displays the data in the vehicle at a resolution that is a function of at least one of a vehicle parameter and a personal parameter.

61 Claims, 6 Drawing figures

Previous Doc Next Doc Go to Doc#

L15: Entry 1 of 9 File: USPT Oct 12, 2004

US-PAT-NO: 6804606 / 6748318
DOCUMENT-IDENTIFIER: US 6804606 B2

TITLE: Notification systems and methods with user-definable notifications based upon vehicle proximities

DATE-ISSUED: October 12, 2004

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Jones; M. Kelly | Delray Beach | FL | | |

ASSIGNEE-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|---|---|---|---|---|---|
| ArrivalStar, Inc. | Delray Beach | FL | | | 02 |

APPL-NO: 10/ 435780 [PALM]
DATE FILED: May 12, 2003

PARENT-CASE:
This application is a divisional of application Ser. No. 08/852,119 filed on May 6, 1997, which is a continuation-in-part of application Ser. No. 08/434,049, filed on May 2, 1995, now U.S. Pat. No. 5,623,260, and a continuation-in-part of application Ser. No. 08/432,898, filed May 2, 1995, now U.S. Pat. No. 5,657,010, and a continuation-in-part of application Ser. No. 08/432,666, filed on May 2, 1995, now U.S. Pat. No. 5,668,543, said application Ser. No. 08/434,049, is a continuation-in-part of application Ser. No. 08/407,319, filed on Mar. 20, 1995, now abandoned, which is a continuation-in-part of application Ser. No. 08/063,533, filed May 18, 1993, now U.S. Pat. No. 5,400,020, said application Ser. No. 08/432,898, is a continuation-in-part of application Ser. No. 08/407,319, which is a continuation-in-part of application Ser. No. 08/063,533, said application Ser. No. 08/432,666, is a continuation-in-part of application Ser. No. 08/407,319, which is a continuation-in-part of application Ser. No. 08/063,533, said application Ser. No. 08/852,119 claims priority to provisional application No. 60/039,925, filed on Mar. 7, 1997. All of the foregoing patent applications and patents are incorporated herein by reference in their entirety.

INT-CL: [07] G08 G 1/123

US-CL-ISSUED: 701/213; 701/202, 701/207, 340/989, 340/994, 342/357.17
US-CL-CURRENT: 701/213; 340/989, 340/994, 342/357.17, 701/202, 701/207

FIELD-OF-SEARCH: 701/200, 701/201, 701/202, 701/204, 701/207, 701/213, 340/988, 340/989, 340/994, 340/996, 342/357.01, 342/357.06, 342/357.07, 342/357.08, 342/357.09, 342/357.1, 342/357.17

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL | Clear

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ABSTRACT:

Methods and systems are disclosed for permitting a user to define a plurality of different predetermined proximities corresponding respectively with a plurality of different mobile vehicles in relation to a location, for monitoring travel data associated with the plurality of mobile vehicles, and for notifying one or more communications devices associated with the user based upon the different predetermined proximities associated with the vehicles.

32 Claims, 50 Drawing figures

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Drawing Description Text (12):
FIG. 10 is another high level modular diagram of the overall operation of the advance notification system described as system configurations and necessary to show the differences of individual modular configuration preferences of each system. Additionally, this configuration is a simple diagram of an advance notification system, designed to determine a vehicle location by a stop, or delivery at a particular location, without GPS or normal location devices on the vehicle. This system determines vehicle location from a delivery list and acknowledgment of each delivery to the BSCU. The address and distance to the next stop is determined by routing software, mapping software, past records of travel, and actual traffic data systems, compared in the BSCU to determine time, distance, and actual vehicle location prior to a user stop. The ability to notify a user computer as the pre-selected advance notification preferences are activated allows the system to notify the user of a message on a computer screen and/or by audio means when a vehicle is approaching. Other combinations of the configurations (FIG. 7 through FIG. 10) are used based on application, business, and customer needs.

Drawing Description Text (30):
FIG. 28 is a graphic of a map showing impending arrival activation points when a user request is compared with distance, time, or locations, for activating an impending arrival message.

Detailed Description Text (11):
A sensor comparison in the VCU provides the BSCU with more accurate vehicle operational intentions, such as a vehicle door sensor and a location device (e.g., GPS) which may be compared for knowing if the driver has started to the next stop. A cross reference of these sensors and switches can make a determination between the vehicle making a delivery stop and stopping at a road sign or red light or rest area. By comparing the location device outputs and determining when the vehicle is stopped, with the delivery door sensor, a determination of a stop can be assured. Other calculations can be utilized on single sensors such as to count the number of times the delivery door opens and closes, or as a package is scanned as it enters or leaves a vehicle.

Detailed Description Text (25):
FIG. 8 illustrates a system configuration for placing more intelligence and computer processing capabilities in each person's computer 36, as opposed to FIG. 7 where the Base Station Control Unit (BSCU) 14 is controlling the Mapping Software Data Base (MSDB) 14b, the Notification Data Base (NDB) 14c, the User Request Data Base (URDB) 14d and in FIG. 7 these modules are controlled by each Person's Computer (PC) 36 linked to a computer network. By equipping each Person's Computer (PC) 36 with proprietary advance notification system software as illustrated in FIG. 8, different system configurations can be used for optimization and

customization for the end user. Additionally, information sharing between modules on a person's computer 36, as opposed to more modules located at remote locations (FIG. 7) away from each person's computer, may, in some cases, not optimize performance. By locating system modules (proprietary software) on each person's computer, the Base Station Control Unit (BSCU) 14 loading can be minimized. Moreover, actual onscreen video and audio associated with the advance notification warning can be stored on a person's computer, with activation by a vehicle's location as it reaches a predefined location, time, or prior stop. This configuration allows vehicle location information to be received by the Wireless Transceiver (WT) 26. The live vehicle location information is made accessible through the Vehicle Location Data Base (VLDB) 14a. The (VLDB) 14a also analyzes route data by averaging past routes with time from one location to the next. Time of day, day of week and month are also determining factors needed for determining the average travel time from one location to the next. The protocols used for the computer network communication between the modules located on a person's computer 36 and the modules located at a remote site 14 for vehicle location 14a are normally as follows. (a) The Person's Computer (PC) 36 contacts the Base Station Control Unit's (BSCU) 14 Vehicle Location Data Base (VLDB) 14a when vehicle location is needed for monitoring a vehicle for an advance notification warning. Timing cycles are used for vehicle location updates and preferences can be set for communication optimization. (b) The Base Station Control Unit (BSCU) 14 sends vehicle location to the Person's Computer (PC) 36 when a predefined time period expires, the estimated vehicle location is not correct with the actual vehicle location, when a vehicle sensor is activated, or when loading or capacity allows for communication to take place. Additionally, vehicle location 14a information can be sent over a computer network and/or Internet at predefined times and automatically received by each Person's Computer (PC) that is linked to the computer network/Internet. A particular vehicle's location, in-between communication cycles, is established by past vehicle location records and average time needed to travel from one location to the next. Moreover, some configurations only update vehicle locations at a predefined time of day.

Detailed Description Text (35):
However, it should be emphasized that other methodologies could be utilized for determining the communication to or from a location sensor of a delivery vehicle 19. For example, the GPS sensor 25 may communicate with the BSCU 14 when the delivery vehicle is in motion (as indicated by phantom lines in FIG. 1), additional VCU timing cycles for communication controlled by the microprocessor controller 16. At particular times, the longitude and latitude readings or optionally a Universal Transverse Mercator (UTM) grid system number, could be sent when the vehicle is in a stationary position, the communication cycle controlled by the microprocessor could be slowed down to one cycle until the vehicle is in motion again, compared to reference longitude and latitude or (UTM) information readings which were obtained on a cycle per minute when the vehicle is in motion 10. In this way, the determination of the location of a delivery vehicle could be accomplished by less communication to and from the VCU and BSCU 14.

Detailed Description Text (39):
In FIG. 13, the right-hand column illustrates the sequence of events for the BSCU 14, and the left-hand column illustrates the sequence of events on the VCU 12. In the efforts to lower overall communication between the VCU 12 and the BSCU 14 when large vehicle fleets are equipped with the advance notification service, actual vehicle locations in the BSCU are based on past route comparisons, as shown in FIG. 16. FIGS. 14A and 14B are illustrations of a time line for delivery stops and planned route-timing events for each stop. The time line has the following time designations: when the route should start 606, time to each stop 605, and the ability to change the route list 615 when the VCU location sensor determines a difference.

Detailed Description Text (42):

Next, as indicated at flow chart block 45c (FIG. 13), the VCU 12 determines, continuously or periodically, the location of the delivery vehicle 19 by the GPS 25 and sends the BSCU 14 (FIG. 1) the location information in view of the planned route or stop sequence data (derived from initialization of the packages on the vehicle and/or mapping technologies). In the preferred embodiment, the BSCU 14 at least compares the delivery vehicle current location with the planned route location derived from the logistics of current mapping and route planning technology (FIG. 10) for determining time and/or distance away from a user stop. By comparing previous vehicle routes with time differences between waypoints (longitude and latitude points or Universal Transverse Mercator (UTM) grid system information points an average route timing data base may be used to calculate the time to travel from actual vehicle locations to the impending arrival time at a particular stop. Additional traffic flow measurements may be added by comparing time of day, actual live traffic flow sensors, or other methods.

Detailed Description Text (44):
While the delivery vehicle actual locations are compared to the existing travel time and distances (FIG. 15), the BSCU 14 is also storing actual location events (time between longitude and latitude or Universal Transverse Mercator (UTM) grid system information points) for averaging with the planned route/travel time over distances. When the BSCU 14 begins sending messages to user computers at a predefined time, distance, location, and/or prior stop, for the impending arrival of a delivery vehicle 19, each particular user computer 36 receives an electronic message and is displayed on their screen, as indicated in flow chart block 145a (FIG. 16). In one example, as shown in FIG. 16, at waypoint number 20 (140c) along the delivery route, the BSCU 14 places a message (144c) to a user computer at waypoint 30 (140d) of the delivery vehicle actual location. A second example in FIG. 16, shows a user being notified when the vehicle is one mile away (144d) from waypoint 30 (144d). The third example in FIG. 16 shows a user being notified when the vehicle is at a predefined street location (144b). This is accomplished by comparing street mapping software with included longitude/latitude or Universal Transverse Mercator (UTM) grid system information coordinates, notification requests, and the (BSCU) 14 vehicle location data base (VLDB). As shown in the configurations (FIGS. 15 and 16), time is used to cross reference travel between locations. Determining vehicle location, between communication updates, is achieved by comparing times of prerecorded route information, actual live traffic monitoring systems, and statistical data.

Detailed Description Text (46):
Another example compares the list of stops with the vehicle location and determines the last occurrence before the delivery vehicle will cross the predefined marker points to activate the impending arrival message.

Detailed Description Text (48):
As indicated at flow chart block 45f (FIG. 13), the BSCU 14 again determines if the delivery vehicle 19 is on the planned route and stop schedule by analyzing the vehicle location 25 (FIG. 1) and comparing it to the actual stops on the list. Preferably, in this regard, the BSCU 14 at least compares stops on the driver list and the actual location of stops made by the driver to determine if the driver has changed from his route list order. Other stops, such as pickups (FIG. 44), are displayed on the vehicle VCU display, and changes to the route list (FIGS. 42 and 43) order are available to the driver via push button entry. Additionally, so the driver acknowledges a new entry or route update, the VCU may be equipped with an audible sound, such as a buzzer, tone, or different voice recordings for announcing each event without the need for the driver's eyes to look at the VCU display when driving. Accordingly, requests for package pickups are processed in the BSCU 14 and sent to the appropriate vehicle VCU 12 and scheduled into the drivers' list of stops (FIG. 41). The driver has the final opportunity to reschedule (FIG. 43) or move (FIG. 42) an added stop through the VCU 12 push button menu.

Detailed Description Text (54):
Communication methods are normally associated with wireless loading and the ability to handle a fleet of VCU 12 responding to one BSCU 14 in most configurations. When other configurations are used for advance notification systems, such as, (FIG. 19 and FIG. 20) the VCU 12 equipped with a delivery order route list (FIG. 19) 181 and a sensor or activation method for determining when an attempt to deliver a package on the route list has been made, the communication is simply activated by the sensor input. In FIG. 19, the flow chart shows how the VCU 12 and the BSCU 14 communicate to locate a particular vehicle location. To find a vehicle's location 160, in this configuration, the current stop and order of delivery list 161 is determined from the information received by the VCU 12. The location of the last stop 162 and the time of the last stop 163, is compared with the next delivery stop 165 and the distance 166 and time 167 between the stops for an estimated time of arrival 169. Mapping software 14b and prior route records of past deliveries 168 provide additional data for determining the vehicle's location. Determining the activation of an advance notification warning associated with this configuration is shown in FIG. 20. When a delivery or an attempted delivery is made 191, the information is sent 191a from the VCU 12, to the BSCU 14, and the BSCU 14 determines what stop is next on the delivery list 193, and then tries to find this next stop in the data base 194. If the user has information in the data base, preferences for sending an impending arrival message 195 are established and a message is sent to this person's computer of the impending arrival of a vehicle 196.

Detailed Description Text (67):
Furthermore, FIG. 7, FIG. 8, FIG. 9, and FIG. 10, are examples of general block diagrams containing, but not limited to, system modules and their ability to be moved or removed, without loosing the scope of the present invention. The ability to move the system modules (FIG. 7) for the implementation of a advance notification system requiring a person's computer to only have normal networking software, such as an internet browser from Netscape, Microsoft, America Online, etc. or Local Area Networks (LAN) attached to an information server for receiving vehicle impending arrival information, or most other networks with the ability to send and receive information over Cable, Fiber, Copper, or wireless channel/s. As shown in this diagram, a person's computer 36 is acknowledging a vehicle's impending arrival. In block 14, one module is receiving vehicle information from the VCU's 12. While this module indicates a wireless transceiver 26, it is replaced when a gateway converts wireless information into land line information with a modem. The vehicle location data base 14a, stores vehicle location information. The Mapping Software Data Base (MSDB) 14b is provided to locate roads and streets associated with the person's address and the vehicle's route from one stop to the next, this Mapping Software Data Base 14b also associates GPS numbers with actual physical addresses, distances over streets, roads, highways, etc. The Notification Data Base (NDB) 14c maintains location points, distances, times, and other activation information, associated with a person's physical address. In this illustration the Notification Data Base (NDB) 14c also is used to activate and send messages to the person's computer 36. The User Request Data Base (URDB) 14d stores user preferences, account information, and in this illustration, software used for entering or making changes to this data. By moving some of the system modules (FIG. 8), described as the BSCU 14, to the person's computer area 36, the person's computer 36 is able to process more of the information associated with the advance notification system. The person's computer 36 accesses vehicle location information from the BSCU 14 over a network, then compares the information to, but not only to, the MSDB 14b, the NDB 14c, and the URDB 14d. Furthermore, displaying additional information on-screen and/or additional audio messages associated with an impending arrival of a vehicle is easily accomplished. FIG. 9, is an example of tracking a vehicle without the use of a GPS location, or having another suitable location device on the vehicle. The control process compares route stop addresses 21b with sensor inputs at each location 22a. The location is logged into the Vehicle Location Data Base (VLDB) 14a and the next stop is looked up for tracking the

actual path (streets/roads) 21b and averaging the normal time to the next stop, with vehicle location estimations along each road. The person's computer 36 is equipped with software for placing an image of the location of the vehicle on a map 14b, activating an impending arrival message from the NDB 14c, when the vehicle reaches a predetermined location, and storing the user preferences in a data base 14d.

Detailed Description Text (74):
Next, as shown in FIG. 48 flow chart block 61, the BSCU 14 waits for communication from the VCU 12, when communication is established information regarding (a) the time of the on-board clock 63, (b) the list of stops and related information 64, (c) other information to be displayed for the vehicle driver 65 on the VCU LCD, and (d) when needed, a resetting of the communication method is added and then a shut down of communication 67 is initiated, based on system configuration. In addition, route data 64 is gained from the VCU 12 driver or package sensor input or from the BSCU 14 ability to access a local data base with driver information or a combination of these inputs. The route data 64 includes information pertaining to each delivery stop location, before and after stops, and cargo. This information is normally displayed on the VCU 12 liquid crystal display (LCD) for the driver's viewing. The prioritizing of the driver's list is based on, but not limited to, mapping software, the driver input, and past recorded route data. From the route data 64 and the information listed above as (a), (b), (c), and (d), the BSCU 14, can determine the location of the vehicle by, as indicated by FIG. 22, flow chart blocks 201 and 14a, and determine when to send impending arrival messages 202 based on this location, as the vehicle starts and continues its route, as indicated by a flow chart block 202. In the case where the delivery vehicle 19 is stopped in-between scheduled stops, the VCU 12 resets its on-board communication clock cycle back so that the communication to the BSCU 14 is stopped, until the vehicle restarts it route or progress. When the delivery vehicle restarts it route, the standard communication cycle is restarted. In the case where the delivery vehicle 19 is in start and stop traffic, the VCU 12 communication cycles are normally stopped until the vehicle is moved a predefined distance, reaches a location associated with the activation of an impending message or the ignition switch is turned to the off/on position 24, or a sensor is activated on the VCU 12. The VCU 12 communication cycles (FIG. 23) are programmable from the BSCU 14 and are reset when a distance 904, or time 905, to the next messaging point excessively exceeds the number of minutes 907, miles 906, from the location to which a user impending arrival message is to be sent. Moreover, this communication change can be preset at the beginning of a route at areas and times the vehicle's location is not associated with an impending arrival message and at times when the vehicle can become off its estimated route without effecting the impending arrival messaging for a brief time. While the route is in progress, the BSCU 14 can determine from the mapping software, current route data, and past recorded route data 908, when to send a VCU 12 a request to use cycle communication. Moreover, in the situation where the delivery vehicle VCU 12 has stopped sending vehicle location communication to the BSCU 14, as requested by the BSCU 14 or in-between communication cycles from the VCU 12, the BSCU 14 can determine the estimated vehicle location from past routes, delivery lists, mapping software, and additional road/traffic monitoring systems for controlling the communication of the VCU 12. When the vehicle has reached a cycle completion, predetermined by location or time and known by the BSCU 14 and VCU 12, a communication link to the BSCU 14 is not necessarily made at this time. As the communication method is changed back to route comparison 14a (FIG. 15), if the vehicle's planned route location 140a matches it's actual route location, communication to the BSCU 14 is not needed. Essentially, the communication methods are controlling the overall communication loading needed for vehicle location and messaging associated with the vehicle location between the BSCU 14 and the VCU 12. To better understand clock cycles: clock cycles are time (minutes/seconds) lapses or distance lapses for particular location points (longitude/latitude numbers from GPS) or actual miles, and are started, controlled (more/less), and used for decreasing communication from a delivery vehicle VCU 12

to the BSCU 14.

Detailed Description Text (75):
Finally, as shown in FIG. 21, flow chart block 99, the BSCU 14 may slow down or speed up the communication clock cycle by determining the Vehicle Location Determining Factor (VLDF) 99. The VLDF is used to determine the likelihood of delays between two stops. To determine the VLDF rating, the current vehicle location 100, the next stop and route to the next stop 101 are compared to past route records 103. If the vehicle is likely to travel the same speed and take the same amount of time as previously recorded vehicles, the communication cycle is slowed down.

Detailed Description Text (86):
While in the main looping operation, a determination is first made as to whether the delivery vehicle 19 has reached the end of the route or deliveries/pick ups. If the vehicle 19 is at the end of its route, then the vehicle communication process is slowed down or stopped, and does not need to be restarted or increased unless switches 20, 21, 22, or 23 are triggered by the driver. Otherwise, the process continues and makes a determination as to the vehicle location, as indicated in flow chart block 25. In the preferred embodiment, the delivery vehicle 19 location and total expired time at each stop is not a factor. But if the VCU 12 notices a change in a delivery stop when a stop is made at a delivery location not on the list, or out of sequence, a driver prompt is displayed on the VCU/LCD screen 33. Additionally, a package scanned out (delivery was made or attempted) could also determine an out-of-sequence delivery. When the delivery vehicle 19 is stopped for an out-of-sequence delivery, then the communication is initiated to the BSCU 14, as shown by a telephone bell symbol 18 in FIG. 1. The communication is an override and not part of a normal communication event, such as, a clock cycle, a distance/location cycle, a route comparison, or polling protocol, but a special need for informing the BSCU 14 of a special occurrence.

Detailed Description Text (87):
The first attempt to correct the list is a flashing screen from the VCU 12 for the driver. If the driver responds, menus of questions are asked and the driver responses are recorded from the switches 21, 22, and 23 (FIG. 1). On screen questions are "is this delivery out of order?" if the driver selects yes, "is (address) your next stop?" if yes the information is uploaded to the BSCU 14 and the route continues, if no, a choice is given from the route list, and the driver is asked to highlight the next stop. The information is then uploaded to the BSCU 14. When the process is not corrected by the driver, then the BSCU 14 process determines the driver intent by comparing the vehicle direction, locations to closest stops, and past times of deliveries to these stops, with destinations from the route list, and makes a calculated determination of the driver's intent. The new sequence of stops is downloaded into the VCU 12 and the next stop location and question "is this correct" is displayed to the driver. Normally one of two events occurs, the driver responds or the vehicle arrives at a stop. If none of the switches 21, 22, or 23 have been actuated, then the process 76 will loop back around and begin once again. Otherwise, if actuation of a switch 21, 22, or 23 is detected, then the process will determine which of the switches 21, 22, 23 have been actuated.

Detailed Description Text (92):
Although the description in FIG. 22 is from a BSCU controller, the BSCU 14 or modules in the BSCU 14 may be better incorporated into a user computer. Three examples of different type configurations for displaying impending arrival information on a computer connected to a network are shown in FIG. 7, FIG. 8, FIG. 9, and FIG. 10. For illustration purposes, the system described as a BSCU 14 is considered different than a person's computer, which could be considered part of the BSCU 14 operation. In FIG. 7 the person's computer is equipped with networking software, and is not associated with an advance notification system. In FIG. 8 the

person's computer is equipped with all the advance notification modules for activating 14c and 14d impending arrival messages, mapping software 14b for displaying and/or comparing vehicle locations to streets, and a method for getting and/or receiving actual vehicle location from a network address. In FIG. 9 and FIG. 10, the example shows advance notification systems for tracking vehicles without GPS location devices. The BSCU 14 modules in FIG. 9 are set to track delivery stops from a route list and delivery stops within each route, then the vehicle location information is sent to the person's computer or accessed from the person's computer for vehicle location information. The vehicle location is compared in the person's computer, then activated and displayed when the user preferences match the actual vehicle's location. FIG. 10 is placing all modules in the BSCU 14 area and not requiring the person's computer to be equipped with any extra software (FIG. 49). As a note, the main differences between FIG. 7 and FIG. 10 are the methods used for determining vehicle location or stop points.

Detailed Description Text (94):
In the preferred embodiment, a person's computer can activate an impending arrival message when software is residing on a person's computer 223 as shown in FIG. 25. The software compares vehicle location 224 and user activation preferences 225 to the user preferences display options 226a and user audio options 227a, each time a vehicle is approaching.

Detailed Description Text (95):
The methods used for signing up and providing the system with messaging preferences is accomplished with software on a person's computer or in the preferred embodiment, linked to a remote computer site FIG. 29. By linking to the site a person wanting to sign up may download software 380 (FIG. 29) to save online time, or sign up from a connection to a remote site 381. The user can only subscribe and make changes from the site to be notified 382, FIG. 30, and the computer address is given before this screen (not shown). This allows the advance notification system to have a level of security. The person is prompted to enter a telephone number 383, then a mailing address 384. This information is stored and compared to mapping software for placing the person's address on a map for display 385b, FIG. 31. After the information is displayed 385b, the user is prompted to agree with the location or choose the next one from a list 386, until their location on a map is agreed upon. The next area allows the user to select different activation and messaging methods for different vehicles 387, FIG. 32. When the same for vehicles in a particular category 389, or each vehicle is different 390, display screens shown as illustrations in FIG. 33 through FIG. 39 are looped for each vehicle/group selected. The next screen prompt asks, "when you would like to be notified?" 392 (FIG. 33) and options for time before arriving 393, distance before arriving 394, or at a location/s of choice 395. When a person entering time before vehicle arrives for notification, the next screen (FIG. 34) allows the minutes and seconds before a stop to be selected. When a person enters distance before a vehicle arrives for an impending arrival message (FIG. 35), the distance can be selected as shown. When a person selects to define a particular area for impending arrival activation, the person can choose a circle around their home/business, as shown in FIG. 36. The circle can be adjusted by pulling the edge with a computer mouse left button held down and releasing when the circle is at a desired size. The activation points are the edges of the circle and/or areas with streets. The next option for selecting an area is the grid perimeter/s (FIG. 37). The actual squares (or other shapes) can be clicked with the left button on a mouse for highlighting areas and adjusting the highlighted areas with the slide bars at the bottom or right for precise positioning for activating impending arrival messages. The next option is placing street markets (FIG. 38) on roads and highways for activation points for impending arrival messaging. The street markers are positioned with a computer's mouse, normal drag and drop operations onto actual areas. Additionally, other areas, such as waypoint/s (longitude/latitude areas), prior vehicle stop/s, letting the vehicle define customer offering services, etc. can be used as well. After defining the locations, the selected preferences are referenced with past route

data, mapping software, and other information for placing notification areas in a data base, to be used when a vehicle is approaching this predefined stop. Next the person wanting impending arrival messages should enter how they would like to receive the message/s (FIG. 39). A person may select a telephone call with a voice message 170, a telephone call with a distinctive ringing sound 171, and/or over a computer network/internet 172, with additional software for on screen displays 173 and/or audio messages 174. Additionally worth noting, sending impending arrival messages to other communication devices 36x (FIG. 2) with addresses or activation numbers from the BSCU would be obvious in the scope of this invention and is therefore not discussed in detail, but would be included in the area of FIG. 39.

Current US Cross Reference Classification (5):
701/207

Other Reference Publication (15):
"PROMISE--Personal Mobile Traveller and Traffic Information Service--Specification of Promise Services, Ver. 7", Telematics Application Programme A2, Transport, Jul. 1, 1996.

Other Reference Publication (16):
"PROMISE--Personal Mobile Traveller and Traffic Information Service13 Generic Promise System Architecture, Ver. 2", Telematics Application Programme A2, Transport, Sep. 10, 1996.

Other Reference Publication (17):
PROMISE--Personable Mobile Traveller and Traffic Information Service--Summary of Promise Public Relation Activities, Ver. 1, Telematics Application Programme A2, Transport, Feb. 12, 1999.

Other Reference Publication (44):
Huber, Paul, "Public Transport Information Systems in Munich", Intelligent Transport Systems World Congress '95--Second Wold Congress on Intelligent Transport Systems, Yokohama, Japan., Nov. 9-11, 1995, pp. 2362-2366.

Other Reference Publication (47):
Dailey, D.J., "Demonstration of an Advance Public Transportation System in the Context of an IVHS Regional Architecture", Proceedings of the First World Congress on Applications of Transport Telematics and Intelligent Vehicle-Highway Systems, Nov. 30-Dec. 3, 1994, Paris, France, pp. 3024-3031.

Other Reference Publication (94):
"Road Transport Research--Intelligent Vehicle High Systems--Review of Field Trials", prepared by An OECD Scientific Expert Group, pp. 1-101, Organisation for Economic Co-Operation and Development--No Date Information Available.

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L15: Entry 3 of 9 File: USPT May 20, 2003

DOCUMENT-IDENTIFIER: US 6567745 B2
TITLE: System and method for distributed navigation service

Application Filing Date (1):
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Detailed Description Text (2):
In the specification, the term "telematic device" or "client device" refers to a device which is generally equipped to receive, process and output information or the like to another device or a user. Historically, telematic devices receive and process digital data including sound, textual and graphic data as, for example, file transfer, electronic mail, facsimiles, electronic posts, data bank access, information center access, images, instructions and multimedia files. While early telematic devices operated in a wired network, many current devices receive data over a wireless network. It should be understood that the present invention contemplates telematic devices that receive data transmitted over a wireless network. Such devices and wireless networks are known in the art.

Detailed Description Text (3):
FIG. 1 is a block diagram generally depicting elements of an embodiment of the present navigation system. The system includes a client device 10 located in a vehicle 8. The client device 10 is a telematic unit that has the capability to transmit signals 32 and receive signals 30 through a wireless communication network or infrastructure 34 as well as several elements described in more detail below. A wireless gateway 36 directs signals to and from the wireless infrastructure 34 to a service center 45. The service center 45 includes a navigation server 40 and a service center workstation 50 and a device to transmit both data and voice information from the navigation server and workstation. The navigation server includes map and directional information. A human operator can operate the workstation 50, which is connected to the navigation server. The navigation server 40 may be accessible, preferably through Internet connection, by a user's web browser 60, so that the user may set route preferences, store common destinations and plan trips.

Detailed Description Text (4):
A vehicle client device 10 is located in the vehicle 8 (generally depicted by the dashed lines at reference character 8). As shown in more detail in FIG. 2, the client device 10 includes a voice command and control system 12. The voice command and control system 12 provides automatic voice recognition of voice communication from the user. The voice command and control system 12 processes voice communications to determine whether a spoken word or speech pattern matches any of the stored grammars or vocabulary. When the system 12 identifies a speech pattern, the system sends an output signal to implement the specific function associated with the specific pattern to the audio decoding and playback portion 14. Many or all of the functions capable of being effected by the voice command system 12 are capable of being controlled by control buttons 18 on the client device.

Detailed Description Text (12):
Through the voice connection, the service representative requests the current location 88 of the vehicle to validate that the location given by the positioning

system 20 is accurate and compares the verbal location with the location given by the positioning system 20. The user requests that the service representative calculate a route to a given destination 90. The service representative enters the destination 92 into the service center workstation 50 and requests that the user validate the destination. The service representative advises the user that the route will be calculated and downloaded to the client device 10. In an alternate embodiment (not shown), the requested destination may be input by keying a phone number with a keypad, or selecting a phone number, which characterizes the destination address. The destination information may be input from a portable computing device (PDA, Laptop) via a local wireless link.

Current US Original Classification (1):
701/209

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